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B2 > 1. (amended) An Integrated Heat Spreader / Integrated Stiffener (IHS/IS)  
mountable to provide stiffening support to a substrate.

A2 2. (amended) An IHS/IS as claimed in claim 1, mountable to provide stiffening support to one of a thin-core and coreless substrate of an integrated circuit printed circuit board (IC-PCB) carrier package.

3. An IHS/IS as claimed in claim 2, the package being one of a pinned grid array (PGA), and a ball grid array (BGA) carrier package.

4. An IHS/IS as claimed in claim 2, the package being one of a flip chip pin grid array (FC-PGA), and a flip chip ball grid array (FC-BGA) carrier package.

A2 5. (amended) An IHS/IS as claimed in claim 1, the IHS/IS substantially made of a thermally conductive material in a form of one of a molded, stamped, etched, extruded and deposited IHS/IS, and is capable of withstanding temperatures of at least normal IC operation.

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B3 > 6. (amended) An IHS/IS as claimed in claim 1, the IHS/IS having an integrated stiffener extension which is substantially planar for mounting to a substantially planar die-side surface of the substrate.

7. An IHS/IS as claimed in claim 1, the IHS/IS having an internal cavity therein to provide clearance for at least one of a die, underfill, and die side component (DSC).

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8. (amended) An IHS/IS as claimed in claim 1, the IHS/IS having separate multiple attachment parts.

A3 9. (amended) An IHS/IS as claimed in claim 1, having a mountable above-substrate cavity-height which is one of equal to, and greater than, an above-substrate height, of a mounted IC-die.

10. (amended) An IHS/IS as claimed in claim 1, the IHS/IS having a mountable bottom surface which is substantially co-planar with a top surface of a combination of an IC-die with interface material.

11. (amended) An IHS/IS as claimed in claim 1, the IHS/IS being mountable to support a heat sink.

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12. An IHS/IS as claimed in claim 1, the IHS/IS having an integrated cooling structure.

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A4 13. (amended) An IHS/IS as claimed in claim 1, the IHS/IS being electrically connectable to the substrate.  
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14. (amended) An IHS/IS as claimed in claim 1, the IHS/IS being electrically insulatable from the substrate.

15. (amended) An IHS/IS as claimed in claim 1, the integrated stiffener portion being an edge/ring stiffener mountable to minor-planar side surfaces of the substrate.

16. (amended) An IHS/IS as claimed in claim 1, the integrated stiffener portion being an edge/ring stiffener having a non-flat cross section mateable with side surfaces of the substrate.

17. (amended) An IHS/IS as claimed in claim 1, the integrated stiffener portion being an edge/ring stiffener where portion of the edge/ring stiffener is preattachable to the substrate.

18. (amended) A carrier package comprising:  
one of a thin core and coreless substrate of an IC-PCB; and  
an IHS/IS mounted to provide stiffening support to said substrate.

19. A carrier package as claimed in claim 18, the package being one of a pinned grid array (PGA), and a ball grid array (BGA) carrier package.

20. A carrier package as claimed in claim 18, the package being one of a flip chip pin grid array (FC-PGA), and a flip chip ball grid array (FC-BGA) carrier package.

AS 21. (amended) A carrier package as claimed in claim 18, the IHS/IS substantially made of a thermally conductive material in a form of one of a molded, stamped, etched, extruded and deposited IHS/IS, and is capable of withstanding temperatures of at least normal IC operation.

SUB B6 22. (amended) A carrier package as claimed in claim 18, the IHS/IS having an integrated stiffener extension which is substantially planar and mounted to a substantially planar die-side surface of the substrate.

23. A carrier package as claimed in claim 18, the IHS/IS having an internal cavity therein to provide clearance for at least one of a die, underfill, and die side component (DSC).

Ab 24. (amended) A carrier package as claimed in claim 18, the IHS/IS is attached as multiple parts.

25. (amended) A carrier package as claimed in claim 18, the IHS/IS having an above-substrate cavity height which is one of equal to, and greater than, an above-substrate plane-height of an IC-die.

26. (amended) A carrier package as claimed in claim 18, the IHS/IS having a bottom surface which is substantially co-planar with a top surface of a combination of an IC-die with interface material.

27. (amended) A carrier package as claimed in claim 18, the IHS/IS having a support portion to support a heat sink.

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28. A carrier package as claimed in claim 18, the IHS/IS having an integrated cooling structure.

29. A carrier package as claimed in claim 18, the IHS/IS being electrically connected to the substrate.

30. A carrier package as claimed in claim 18, the IHS/IS being electrically insulated from the substrate.

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31. (amended) A carrier package as claimed in claim 18, the IHS/IS having an edge/ring stiffener mounted to minor-planar side surfaces of the substrate.

32. (amended) A carrier package as claimed in claim 18, the IHS/IS having an edge/ring stiffener having a non-flat cross section, mated with side surfaces of the substrate.

33. (amended) A carrier package as claimed in claim 18, the IHS/IS having an edge/ring stiffener where a portion of the edge/ring stiffener is pre-attached to the substrate.

34. (amended) A packaged integrated circuit (IC) comprising:  
an IC-PCB carrier package including one of a thin-core and coreless substrate;  
and  
an IHS/IS mounted to provide stiffening support to said substrate.

35. A packaged IC as claimed in claim 34, the carrier package being one of a pin grid array (PGA), and a ball grid array (FC-BGA) carrier package.

36. A packaged IC as claimed in claim 34, the carrier package being one of a flip chip pin grid array (FC-PGA), and a flip chip ball grid array (FC-BGA) carrier package.

37. (amended) A packaged IC as claimed in claim 34, where the IHS/IS is substantially made of a thermally conductive material in a form of one of a molded, stamped, etched, extruded and deposited IHS/IS, and is capable of withstanding temperatures of at least normal IC operation.

38. (amended) A packaged IC as claimed in claim 34, the IHS/IS having an integrated stiffener extension which is substantially planar and mounted to a substantially planar die-side major planar surface of the substrate.

39. A packaged IC as claimed in claim 34, the IHS/IS having an internal cavity therein to provide clearance for at least one of a die, underfill, die-side component (DSC).

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40. (amended) A packaged IC as claimed in claim 34, the IHS/IS having multiple attached parts.

41. (amended) A packaged IC as claimed in claim 34, the IHS/IS having an above-substrate cavity-height which is one of equal to, and greater than, an above-substrate height of a mounted IC-die.

42. (amended) A packaged IC as claimed in claim 34, the IHS/IS having a bottom surface which is substantially co-planar with a top surface of a combination of an IC-die with interface material.

43. (amended) A packaged IC as claimed in claim 34, the IHS/IS having a support portion to support a heat sink.

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44. A packaged IC as claimed in claim 34, the IHS/IS having an integrated cooling structure.

45. A packaged IC as claimed in claim 34, the IHS/IS being electrically connected to the substrate.

46. A packaged IC as claimed in claim 34, the IHS/IS being electrically insulated from the substrate.

47. (amended) A packaged IC as claimed in claim 34, the IHS/IS being an edge/ring stiffener mounted to minor-planar side surfaces of the substrate.

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48. (amended) A packaged IC as claimed in claim 34, the IHS/IS being an edge/ring stiffener having a non-flat cross section mated with side surfaces of the substrate.

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49. (amended) A packaged IC as claimed in claim 34, the IHS/IS Stiffener being an edge/ring stiffener where at least a portion of the edge stiffener is pre-attached to the substrate.

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50. (new) A heat spreader/stiffener device comprising a thermally conductive member having a stiffener portion mountable to one of a thin-core and coreless substrate so as to increase a stiffness thereof, the heat spreader/stiffener device having a thermal path thermally connectable to the substrate.



51. (new) A heat spreader/stiffener device as claimed in claim 50, a stiffener extension bottom surface being substantially planar to facilitate mounting to a substantially planar die-side surface of the substrate.

52. (new) A heat spreader/stiffener as claimed in claim 50, the heat spreader/stiffener having a hollow frame shape to allow clearance for other components on the substrate.

53. (new) A heat spreader/ stiffener as claimed in claim 50, the heat spreader/stiffener mountable to support a heat sink.

54. (new) A heat spreader/stiffener as claimed in claim 50, the stiffener portion being an edge/ring stiffener extension mountable to minor planar side-surfaces of the substrate.

55. (new) An integrated circuit (IC) carrier package comprising:  
an IC;  
at least one of a thin-core and coreless substrate; and  
a heat spreader/stiffener device with a thermally conductive member having a stiffener portion mounted to the substrate so as to increase the substrate stiffness, the heat spreader/stiffener device having a thermal path thermally connected to the substrate.

56. (new) An IC carrier package as claimed in claim 55, the carrier package being one of a pinned grid array (PGA) carrier package and a ball grid array (BGA) carrier package.

57. (new) An IC carrier package as claimed in claim 55, a stiffener extension bottom surface substantially planar and mounted to a substantially planar die-side surface of the substrate.

58. (new) An IC carrier package as claimed in claim 55, the heat spreader/stiffener device having a hollow frame shape to allow clearance for other components on the substrate.

59. (new) A carrier package as claimed in claim 55, the heat spreader/stiffener having a portion to support a heat sink.

60. (new) A carrier package as claimed in claim 55, the stiffener portion being an edge/ring stiffener extension mounted to minor planar side-surfaces of the substrate.

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61. (new) An electronic system comprising:  
an IC carrier package including an IC;  
at least one of a thin-core and coreless substrate; and  
a heat spreader/stiffener device with a thermally conductive member having a stiffener portion mounted to the substrate so as to increase the substrate stiffness, the

heat spreader/stiffener device having a thermal path thermally connected to the  
substrate. *B*

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end* 62. (new) An electronic system as claimed in claim 61, the IC carrier package  
being one of a pinned grid array (PGA) carrier package and a ball grid array (BGA)  
carrier package.

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